

## 1.5 SUMMARY OF POTENTIAL IMPACTS AND MITIGATION MEASURES

### **1.5.1 Introduction**

The proposed Project has been designed to minimize all types of impacts to the natural and human environment, as described in Section 2.3, 'Alternatives.' Table 1.5.2-1 provides a summary of proposed mitigations for all elements of possible impact in terms of studies to avoid impacts, Project design features, construction practices and operations practices.

### **1.5.2 Additional Mitigation for Project Impacts to Habitat, Vegetation, and Wildlife**

The Applicant has proposed to mitigate for all permanent and temporary impacts to habitat caused by the Project in accordance with the ratios outlined in the WDFW Wind Power Guidelines (WDFW, August 2003). A mitigation parcel has been identified within the 8,600-acre Project area. The mitigation parcel is T18N, R21E, Section 27, except for the portion of this section that will be developed as part of the Project. String 'L' follows a ridgeline that bisects Section 27 from north to south. The area set aside for Project mitigation is estimated at approximately 600 acres. This is more than the required replacement habitat under the WDFW Wind Power Guidelines. The Applicant has agreed to fence this parcel to eliminate livestock grazing, assuming the land ownership and grazing practices of adjacent properties at the time the Project goes into operation will require fencing to remove livestock from this parcel. In addition to Section 27, the Applicant is proposing to fence several springs within the Project area to eliminate livestock degradation. Fencing used for the mitigation parcel and the springs will be designed to keep livestock out but allow game species to cross. The Applicant intends to coordinate with Washington Department of Fish and Wildlife (WDFW) regarding fence specifications.



*View of Whiskey Dick Creek in proposed mitigation parcel*

As noted above, WDFW has prepared a set of guidelines for wind power projects east of the Cascades in order to provide guidance for siting and mitigation. These guidelines were followed during selection of Section 27 as a mitigation site for the Project. Section 27 provides opportunity for "like-kind" replacement habitat of equal or higher habitat value than the impacted area and it occurs in the same geographical region as the

impacted habitat. Furthermore, since the Applicant has an option to purchase the property if the Project goes forward, the Applicant can provide legal protection and protection from degradation for the life of the Project. Consistent with WDFW's guidelines, permanent impacts to habitat would be replaced at a ratio equal to or greater than 1:1 for grassland and 2:1 for shrub-steppe.

Additional benefits of Section 27 as a mitigation parcel for the Project include:

- Protection of a segment of Whiskey Dick Creek
- Continuity of habitat with adjacent state lands
- Preservation of a diversity of habitats

Use of Section 27 as a mitigation parcel would result in protection of an approximately 1-mile segment of Whiskey Dick Creek near its headwaters. Protection of waterways and their adjacent riparian habitat provide significant benefits above and beyond replacement of "like-kind" habitat at agreed upon ratios. Protection of this segment of Whiskey Dick Creek provides benefits for water quality, wildlife, and species diversity. In addition, Section 27 is adjacent to state-owned lands. WDNR administers Section 34 to the south and WDFW administers Section 26 to the east. Use of Section 27 for mitigation will provide continuity of habitat with these adjacent state-owned sections. Finally, a variety of habitat types that occur in the general Project area are found in Section 27, so a diversity of habitat types would be preserved. These include shrub-steppe (moderate and dense), herbaceous, herbaceous/rock outcrop, and woody riparian.

<i><b>Table 1.5.2-1; Summary of Impacts and Mitigation Measures</b></i>
<b>EARTH</b>
<p><b>Seismic Hazards</b> - Current engineering standards (UBC) will be used in the design of the Project facilities. These standards require that under the design earthquake, the factors of safety or resistance factors used in design exceed certain values. This factor of safety is introduced to account for uncertainties in the design process and to ensure that performance is acceptable. Application of the UBC in Project design will provide adequate protection for the Project facilities and ensure protection measures for human safety, given the relatively low level of risk for the site.</p> <p>No faults, either active or potentially active, have been mapped in or near the Project site. Based on the lack of faults in the vicinity and the lack of historic seismicity, earthquakes are not considered to pose a significant hazard to the proposed Project.</p>
<p><b>Volcanic Hazards</b> - In the event that a volcanic eruption would damage or impact Project facilities, the Project facilities would be shut down until safe operating conditions return. If an eruption occurred during construction, a temporary shut-down would most likely be required to protect equipment and human health.</p>
<p><b>Erosion</b> - Erosivity of area soils would be mitigated by factors such as grade (i.e., the</p>

**Table 1.5.2-1; Summary of Impacts and Mitigation Measures**

majority of soils that would be disturbed by the Project are located on grades of 20 percent or less) and the fact that area soils are well-drained.

**Erosion** - A detailed construction Storm Water Pollution Prevention Plan (SWPPP) will be developed for the Project to help minimize the potential for discharge of pollutants from the site during construction activities. The SWPPP will be designed to meet the requirements of the Washington State Department of Ecology General Permit to Discharge Storm water through its storm water pollution control program (Chapter 173-220 WAC) associated with construction activities.

**Erosion** - All construction practices will emphasize erosion control over sediment control through such non-quantitative activities as the following:

- Straw mulching and vegetating disturbed surfaces;
- Retaining original vegetation wherever possible;
- Directing surface runoff away from denuded areas;
- Keeping runoff velocities low through minimization of slope steepness and length; and
- Providing and maintaining stabilized construction entrances.

**Landslides** - In general, the Project is located in relatively low-gradient topography with a relatively thin veneer of soil that overlies basaltic bedrock. Therefore, risk of a landslide appears to be minimal overall. If slope failure were to occur, the turbine strings are typically situated at a distance from steep slopes and the turbines and their associated foundation structures would not be affected.

**Unique Features** - In the unlikely event that unique physical or geological features were discovered on-site during construction, construction personnel would stop work at that location and notify the project manager. The project manager would immediately contact appropriate officials at the state historic preservation office to determine an appropriate response.

**Contaminated Soils** - Applicant commissioned KTA of Seattle, WA to conduct a Phase I Environmental Site Assessment (ESA) of property to be developed. This assessment revealed no evidence of environmental impairment within the Project area. Based on these findings, it is not anticipated that any environmental contamination will be encountered during construction or operation of the Project. In the unlikely event that contaminated soils are encountered, Applicant will coordinate with appropriate personnel at Department of Ecology.

### AIR QUALITY

**Emissions** - All vehicles used during construction will comply with applicable Federal and state air quality regulations.

**Emissions** - Operational measures such as limiting engine idling time and shutting down equipment when not in use will be implemented.

**Table 1.5.2-1; Summary of Impacts and Mitigation Measures**

**Emissions** - Carpooling among construction workers will be encouraged to minimize construction-related traffic and associated emissions.

**Dust** - Traffic speeds on unpaved access roads will be kept to 25 mph to minimize generation of dust.

**Dust** - Dust control systems shall be in place and maintained in good operating conditions during all periods of rock crusher and batch plant operation. A water mist will be applied near all emission points along the crushing circuit to control dust. The crusher and batch plant will be shut down when the wind is strong enough that best efforts to keep dust from leaving the pit area are not effective. Stockpiles shall be located to minimize exposure to wind. During cement transfer to the silo, silo exhaust shall be controlled by a properly designed and operated fabric filter device (baghouse). These measures are anticipated to eliminate the possibility of dust plumes within the Project area.

**Dust** - Dust suppression will be performed around batch plant and rock crushing facilities to prevent buildup of fine materials.

**Dust** - Disturbed areas will be replanted or graveled to reduce wind-blown dust.

**Dust** - Active dust suppression will be implemented on construction access roads, parking areas and staging areas, possibly using water-based dust suppression materials in compliance with state and local regulations.

**Dust** - Erosion control measures will be implemented to limit deposition of silt to roadways.

**Operations** - No mitigation is proposed for Project operations as there will be no air or odor emissions.

## **WATER RESOURCES**

**Ground Water** - All excavation and facilities shall be relatively shallow and will not exceed a maximum of 35 feet in depth for the turbine foundations. The roads, tower foundations and other facilities are sufficiently above the water table to avoid any significant impacts to subsurface hydrology and will have no direct effect on groundwater quantity, quality, and flow direction in the immediate area below the proposed facilities. There will be no well installed to service the operation and maintenance facility. Project roads will be designed and surfaced to eliminate impacts to groundwater.

**Surface Water** - No Project facilities or transmission feeder line poles or trails will be built in or near any streambed, riparian corridor or wetlands. There is one stream, Parke Creek, that the BPA feeder line crosses. To avoid any impacts, the transmission feeder poles will be located at least 200 feet back from the stream bank on either side and no heavy equipment will be used in the stream bed or riparian corridor for construction.

**Surface Water** - A formal Storm Water Pollution Prevention Plan (SWPPP) specifying the types of erosion control methods that will be used at the site will be designed and

**Table 1.5.2-1; Summary of Impacts and Mitigation Measures**

submitted to EFSEC for approval prior to construction. After construction is completed, temporarily disturbed areas will be returned as closely as possible to their original state. This excludes the access roads, crane pads, rock quarries, O&M facilities, and parking areas, which will remain in place for the life of the facility. On-site construction management will monitor the area for erosion and implement additional control measures if necessary.

**Surface Water** - Operational BMPs will be adopted, as part of the SWPPP, to implement good housekeeping, preventive and corrective maintenance procedures, steps for spill prevention and emergency cleanup, employee training programs, and inspection and record keeping practices, as necessary, to prevent storm water pollution.

Examples of good operational housekeeping practices, which will be employed by the Project, include the following:

- Prompt cleanup and removal of spillage;
- Regular pickup and disposal of garbage;
- Regular sweeping of floors;
- HAZMAT data sheet cataloguing and recording; and
- Proper storage of containers.

**No Discharge** - Operation of the Project will not require the use of any water for cooling or any other use aside from the limited needs of the Operations and Maintenance facility (substantially less than 1,000 gallons per day). There will be no industrial wastewater stream from the facility (only domestic type wastewater from the O&M building which will discharge to an on-site septic system) and thus no wastewater will be used or discharged for Project operations.

**Conservation** - Environmentally benign dust palliatives such as lignin may be added to water to improve the efficacy of dust suppression and reduce water use during construction.

## VEGETATION AND WETLANDS

**Studies to Avoid Impacts** - The Applicant has commissioned extensive studies by qualified biologists at the Project site to avoid impacts to sensitive populations. These studies, results of which are included as Exhibit 12, include:

- Rare plant surveys;
- Habitat mapping;

The results and recommendations of these studies have been incorporated into the proposed design, construction, operation and mitigation for the Project.

**Project Area Habitats** - The Applicant has proposed to mitigate for all permanent and temporary impacts to habitat caused by the Project in accordance with the ratios outlined in the WDFW Wind Power Guidelines (WDFW, August 2003). The area set aside for Project mitigation is approximately 600 acres. This is more than the required replacement habitat under the WDFW Wind Power Guidelines. The Applicant has agreed

***Table 1.5.2-1; Summary of Impacts and Mitigation Measures***

to fence this parcel to eliminate livestock grazing, assuming the land ownership and grazing practices of adjacent properties at the time the Project goes into operation requires fencing to remove livestock from this parcel. In addition to the parcel above, the Applicant is proposing to fence several springs within the Project area to eliminate livestock degradation. Fencing used for the mitigation parcel and the springs will be designed to keep livestock out but allow game species to cross. The Applicant intends to coordinate with Washington Department of Fish and Wildlife (WDFW) regarding fence specifications.

**Unique Species** - The only unique species or rare plant that may be impacted by the Project is hedgehog cactus, a Washington State Review list species. Access to the site will be controlled during both construction and operations, which should provide greater protection than is currently afforded to this species. As collection of this species for gardens has been cited as a reason for its decline, if such collection becomes a problem at the Project site, the Applicant will post a sign at the visitors' kiosk indicating that collection of any plants in the Project area is prohibited.

**Critical Areas/Priority Habitats** - Since no Kittitas County critical areas will be impacted by the Project, no mitigation is recommended. Shrub steppe is considered a priority habitat by WDFW. The Applicant has selected a mitigation site that exceeds the WDFW's guidelines for mitigation of shrub steppe for wind power projects east of the Cascades.

**Wetlands** - There are a few Class 3 wetlands in the form of seeps and springs within the Project area, however, all Project facilities will be located a considerable distance from them to prevent any impacts to these wetlands.

**Noxious Weeds** - To avoid, minimize, or reduce the impacts of noxious weeds, the following mitigation measures will be implemented:

- The contractor will clean construction vehicles prior to bringing them in to the Project area from outside areas.
- Disturbed areas will be revegetated as quickly as possible with native species.
- Revegetation seed mixes will be selected in consultation with WDFW and Kittitas County Noxious Weed Control Board.
- If hay is used for sediment control or other purposes, hay bales will be certified weed free.
- Access to the site will be controlled which may result in a lower level of disturbance and fewer opportunities for noxious weeds to be introduced and/or spread than is currently the case. Noxious weeds that may establish themselves as a result of the Project will be actively controlled in consultation with the Kittitas County Weed Control Board.

**Construction** - Construction personnel will be required to avoid driving over or otherwise disturbing areas outside the designated construction areas, and an environmental monitor during construction will be designated to monitor construction



**Table 1.5.2-1; Summary of Impacts and Mitigation Measures**

activities and ensure compliance with mitigation measures.

### **AGRICULTURAL CROPS AND LIVESTOCK**

**Noxious Weeds** - As described above in 'Vegetation and Wetlands', an active noxious weed control program will be implemented, in consultation with the Kittitas County Noxious Weed Control Board during both construction and operations to effectively prevent and minimize the introduction and/or spread of invasive species.

**Livestock** - The land area that will be temporarily disturbed during construction is approximately 360 acres. Of this area, approximately 7.5 acres will be cleared of vegetation. These temporarily disturbed areas will be reseeded after construction with an appropriate native seed mix and is expected to recover over time, particularly given that disturbance corridors are largely linear in nature.

**Livestock** - The Applicant has agreed to allow controlled hunting within the Project area in coordination with the WDFW in order to allow management of the elk and deer populations and to prevent creation of a sanctuary effect that could lead to greater agricultural damage from big game to farms and ranches in the area.

### **WILDLIFE**

**Studies to Avoid Impacts** - The Applicant has commissioned extensive studies by qualified biologists of wildlife at the Project site to avoid impacts to sensitive populations. These studies, results of which are included as Exhibit 14, include:

- Habitat mapping;
- Avian use point count surveys;
- Aerial raptor nest surveys;
- Sage grouse surveys
- Big game surveys;
- Non-avian wildlife surveys;

The results and recommendations of these studies have been incorporated into the proposed design, construction, operation and mitigation for the Project.

**Project Design** - The proposed design of the Project incorporates numerous features to avoid and/or minimize impacts to plants and wildlife. These features are based on site surveys, experience at other wind power projects, and recommendations from consultants performing studies at the site. Features of the Project that are designed to avoid or minimize impacts to wildlife include the following:

- Avoidance of construction in sensitive areas such as streams, riparian zones, wetlands, forested areas;
- Avoidance of placing wind turbines in prominent saddles along the main Whiskey Dick Ridge to minimize potential impacts to raptors;
- Minimization of new road construction by improving and using existing roads and trails instead of constructing new roads;
- Choice of underground (vs. overhead) electrical collection lines wherever feasible

***Table 1.5.2-1; Summary of Impacts and Mitigation Measures***

<p>to minimize perching locations and electrocution hazards to birds;</p> <ul style="list-style-type: none"><li>• Choice of turbines with low RPM and use of tubular towers to minimize risk of bird collision with turbine blades and towers;</li><li>• Use of bird flight diverters on guyed permanent meteorological towers or use of unguyed permanent meteorological towers to minimize potential for avian collisions with guy wires;</li><li>• Equipping all overhead power lines with raptor perch guards to minimize risks to raptors; and</li><li>• Spacing of all overhead power line conductors to minimize potential for raptor electrocution.</li></ul>
<p><b>Project Design</b> - The Project layout (Exhibit 1-B) has been designed to avoid any impacts to streams and riparian areas. Roads, underground cables, turbine foundations, transmission poles and other associated infrastructure will not be located within any riparian areas or streams. In addition, the proposed construction activities for the transmission feeder lines will not involve the use of any heavy equipment in stream beds or riparian areas.</p>
<p><b>Construction</b> - Applicant proposes the use of construction techniques and Best Management Practices (BMPs) to minimize potential impacts to wildlife. These include the following:</p> <ul style="list-style-type: none"><li>• Use of BMPs to minimize construction-related surface water runoff and soil erosion</li><li>• Use of certified “weed free” straw bales during construction to avoid introduction of noxious or invasive weeds;</li><li>• Flagging of any sensitive habitat areas (e.g. springs, raptor nests, wetlands, etc.) near proposed areas of construction activity and designation of such areas as “off limits” to all construction personnel;</li><li>• Development and implementation of a fire control plan, in coordination with local fire districts, to minimize risk of accidental fire during construction and respond effectively to any fire that might occur;</li><li>• Establishment and enforcement of reasonable driving speed limits (max 25 mph) during construction to minimize potential for road kills;</li><li>• Proper storage and management of all wastes generated during construction;</li><li>• Require construction personnel to avoid driving over or otherwise disturbing areas outside the designated construction areas;</li><li>• Limit construction activities during winter months to minimize impacts to wintering big game</li><li>• Designation of an environmental monitor during construction to monitor construction activities and ensure compliance with mitigation measures.</li></ul>
<p><b>Habitat</b> - Temporarily disturbed areas that have been cleared of vegetation will be reseeded with an appropriate mix of native plant species as soon as possible after construction is completed to accelerate the revegetation of these areas and to the prevent spread of noxious weeds. The Applicant will consult with Washington Department of</p>



**Table 1.5.2-1; Summary of Impacts and Mitigation Measures**

Fish and Wildlife regarding the appropriate seed mixes for the Project area.

**Post-Construction Monitoring** - The Applicant proposes to develop a post construction monitoring plan for the Project to quantify impacts to avian species and to assess the adequacy of mitigation measures implemented. The monitoring plan will include the following components: 1) fatality monitoring involving standardized carcass searches, scavenger removal trials, searcher efficiency trials, and reporting of incidental fatalities by maintenance personnel and others; and 2) a minimum of one breeding season raptor nest survey of the study area and a 1 mile buffer to locate and monitoring active raptor nests potentially affected by the construction and operation of the Project.

The protocol for the fatality monitoring study will be similar to protocols used at the Vansycle Wind Plant in northeastern Oregon (Erickson *et al.*, 2000) and the Stateline Wind Plant in Washington and Oregon (FPL *et al.*, 2001).

The Applicant proposes to convene a Technical Advisory Committee (TAC) to evaluate the mitigation and monitoring program and determine the need for further studies or mitigation measures. The TAC will be composed of representatives from Washington Department of Fish and Wildlife, EFSEC, Kittitas County, local interest groups (e.g., Kittitas Audubon Society), Project landowners, and the Applicant. The role of the TAC will be to review results of monitoring studies to evaluate impacts to wildlife and habitat, and address issues that arise regarding wildlife impacts during operation of the Project. The post-construction monitoring plan will be developed in coordination with the TAC.

**Operations** - During Project operations, appropriate operational BMPs will be implemented to minimize impacts to plants and animals. These include the following:

- Implementation of a fire control plan, in coordination with local fire districts, to avoid accidental wildfires and respond effectively to any fire that might occur;
- Establishment and enforcement of reasonable driving speed limits (max 25 mph) during operations to minimize potential for road kills;
- Operational BMPs to minimize storm water runoff and soil erosion;
- Implementation of an effective noxious weed control program, in coordination with the Kittitas County Noxious Weed Control Board, to control the spread and prevent the introduction of noxious weeds;
- Identification and removal of all carcasses of livestock, big game, etc. from within the Project that may attract foraging bald eagles or other raptors;
- Control public access to the site to minimize disturbance impacts to wildlife, especially in the winter months;
- Allow limited and controlled hunting on the site and allow WDFW access to the site to manage big game herds and minimize big game damage to nearby agricultural lands.

## FISHERIES

**Project Design** - The Project layout (Exhibit 1-B) has been designed to avoid any

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impacts to streams and riparian areas. Roads, underground cables, turbine foundations, transmission poles and other associated infrastructure will not be located within any riparian areas or streams. BMPs will be initiated to retain sediment from disturbed areas and minimize areas of disturbance.

**Construction** - The proposed construction activities for the transmission feeder lines will not involve the use of any heavy equipment in stream beds or riparian areas.

### ENERGY AND NATURAL RESOURCES

**Conservation** - During construction, conservation measures will include recycling of construction wastes where possible and encouragement of carpooling among construction workers to reduce emissions and traffic.

**Conservation** - Several conservation measures will be undertaken during operations:

- The O&M facility will utilize station power for electricity needs.
- Water usage at the site will be closely monitored during operations due to the limited capacity of the on-site water storage tank.
- Carpooling and among operations workers will be encouraged.
- Recycling of waste office paper and aluminum will be encouraged.

### NOISE

**Project Design** - Overall, modern wind turbines are typically quiet, especially when compared to their combustion-based alternatives. The noise generated by wind turbines is likely to be most noticeable when wind speeds are low (8-10 mph) at receptors. Wind turbine noise tends to be masked by other background sources (i.e., the sound generated by the wind) at higher wind speeds. Project will comply with WAC 173-60-040, 'Noise Levels'.

**Project Design** - Audible noise from the high voltage transmission feeder line(s) will comply with the level specified in 173-60-040 WAC (see Table 3.9.1-3). Lines owned by the Bonneville Power Administration (BPA) will comply with the BPA's limits, namely an L<sub>50</sub> level of 50 dBA at the edge of the right-of-way (Perry, D., Bonneville Power Administration, "Sound Level Limits from BPA Facilities", BPA memorandum, May 26, 1982.)

**Project Design** - Substation transformers and high voltage switching equipment shall be specified or designed to comply with the level specified in 173-60-040 WAC (see Table 3.9.1-3) namely the 70 dBA limit at all Class C EDNA (industrial/agricultural) property lines and 60 dBA at all residences (Class A EDNA).

**Construction** - All noise-generating construction activities will be conducted between the hours of 7 a.m. and 10 p.m. and are therefore exempt from the limits presented in Table 3.9.1-3 (per 173-60-050 WAC). Blasting is anticipated for the foundations and potentially some road areas. Blasting will be conducted only between the hours of 7 a.m. and 10 p.m. and is anticipated to occur over a period of eight weeks. Blasting activities are specifically exempted from the noise regulations (per WAC 173-60-050 (1)(c)).

***Table 1.5.2-1; Summary of Impacts and Mitigation Measures***

<b>LAND USE</b>
<b>Project Design</b> - The primary land use in the area, livestock grazing, can continue around Project facilities and transmission feeder lines. Land use impacts associated with construction and operation of the Project and associated transmission feeder lines will be negligible because they will not impair or impact current land uses, change land use patterns, or be incompatible with existing uses or zoning ordinances.
<b>Compliance</b> - The proposed Project is not presently in compliance with local land use plans and zoning ordinances. The Applicant will make application for change in, or permission under, Kittitas County land use plans and zoning ordinances and will make all reasonable efforts to resolve the noncompliance. In the event the Applicant's reasonable efforts fail to achieve compliance, Applicant will apply to EFSEC for preemption of such plans and ordinance pursuant to Chapter 463-28 WAC.
<b>VISUAL RESOURCES / LIGHT AND GLARE</b>
<b>Turbine Appearance</b> - The wind turbine towers, nacelles, and rotors used will be uniform and will conform to the highest standards of industrial design to present a trim, uncluttered, aesthetically attractive appearance.
<b>Turbine Color</b> - Turbines will have neutral gray finish to minimize contrast with the sky backdrop.
<b>Turbine Reflectivity</b> - A low-reflectivity finish will be used for all surfaces of the turbines to minimize the reflections that can call attention to structures in a landscape setting.
<b>Turbine Activity</b> - Because of the wind conditions at the site and the high level of reliability of the equipment being used, the rotors will be turning approximately 80-85% of the time, minimizing the amount of time that turbines will appear to be non-operational, a condition that the public often finds to be unattractive.
<b>Turbine Lighting</b> - The only exterior lighting on the turbines will be the aviation warning lighting required by the FAA. It will be kept to the minimum required intensity to meet FAA standards. It is anticipated that the FAA will soon be issuing new standards for marking of wind turbines that will entail lighting far fewer turbines in a large wind farm than is now required, and having all the lights synchronized. These potential regulatory changes are being closely monitored, and if, as is likely, they are made before Project construction begins, the aviation safety marking lighting will be designed to meet these standards.
<b>Turbine Shadow Flicker</b> - The Project is not expected to result in any shadow flicker effects for any sensitive receptors due to the distance between the nearest receptors (houses) and the Project's wind turbines. The closest house is almost 2 miles from the nearest proposed wind turbine, which is well beyond the distance at which shadow flicker can cause impacts. A detailed discussion and analysis of the Project's potential to create

***Table 1.5.2-1; Summary of Impacts and Mitigation Measures***

shadow flicker, including the results of modeling performed by Wind Engineers, is included as Exhibit 9, 'Shadow Flicker Briefing.'

**Equipment Color** - The small cabinets containing pad-mounted equipment that will be located at the base of each turbine will have an earth-tone finish to help them blend into the surrounding ground plane.

**Electrical System Visibility** - Nearly all of the Project's electrical collection system will be located underground, eliminating visual impacts.

**Electrical System Appearance** - On the small segment of the electrical collection system that will be above ground, simple wooden poles, non-specular conductors (i.e. conductors that have a low level of reflectivity), and non-reflective and non-refractive insulators will be used. This line parallels two sets of overhead high voltage transmission lines and an existing gravel road.

**Roads** - To the extent feasible, existing road alignments will be used to provide access to the turbines, minimizing the amount of additional surface disturbance required. Where possible, access road widths will be restricted to 20 feet (approximately half of all access road miles.) The access roads will have a gravel surface and will have grades of no more than 15%, minimizing erosion and its visual effects.

**Facilities** - The O&M facility building will have a low-reflectivity earth-tone finish to maximize its visual integration into the surrounding landscape.

**Facilities** - The parking areas at the O&M facility will be covered with gravel, rather than asphalt, to minimize contrast with the site's soil colors.

**Facilities** - Outdoor night lighting at the O&M facility and the substation(s) will be kept to the minimum required for safety and security, sensors and switches will be used to keep lighting turned off when not required, and all lights will be hooded and directed to minimize backscatter and off-site light dispersion.

**Substation** - At the substation(s), all equipment will have a low reflectivity neutral gray finish to minimize visual salience.

**Substation** - All insulators in the substations and on takeoff towers will be non-reflective and non-refractive.

**Substation** - The control buildings located at each substation would have a low-reflectivity earth-tone finish.

**Substation** - The chain link fences surrounding the substations will have a dulled, darkened finish to reduce their contrast with the surroundings.

**Construction** - During the construction period, active dust suppression will be implemented to minimize the creation of dust clouds.

**Construction** - When construction is complete, areas disturbed during the construction

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process will be reseeded to facilitate their return to natural appearing conditions.

### **POPULATION, HOUSING, AND ECONOMICS**

**Population and Housing** - There will not be a significant increase in population or housing demands due to the small number of workers (14-18) required for operations. There appears to be an adequate supply of temporary housing available to accommodate non-local workers during construction; therefore, no mitigation measures are proposed.

**Economics** - The Project is projected to result in an estimated \$1.6 million per year in added income and 26-30 additional jobs in Kittitas County. The overall socioeconomic impact of the Project will be strongly positive for Kittitas County in terms of increased property tax base and employment opportunities, thus no mitigation measures are planned for population, housing, and economics.

### **PUBLIC SERVICES AND UTILITIES/RECREATION**

**Fire, Police, EMS** - The Applicant will provide all police, fire, and emergency medical personnel with emergency response details for the Project including detailed maps of the Project site access roads, Applicant contact information, procedures for rescue operations to the nacelles, and location of the rescue basket.

**Fire** - Potential impacts to fire services will be mitigated by the following:

- Applicant has initiated discussion with local fire district(s) regarding a contract for fire protection services during construction;
- Provisions for special training of fire district personnel for fires related to wind turbines, and for EMS personnel in how to use a rescue basket that will be kept at the operations and maintenance facility for the purpose of removing injured employees from the towers;
- Providing detailed maps to fire districts that show all access roads to the Project;
- Providing keys to a master lock system to emergency responders that will enable emergency personnel to unlock gates that would otherwise limit access to the Project;
- Use of spark arresters on all power equipment (e.g., cutting torches and cutting tools), when necessary due to extreme fire danger conditions;
- Informing workers at the Project of emergency contact phone numbers and training them in emergency response procedures;
- Carrying fire extinguishers in all maintenance vehicles.

**Operations** - During operation of the Project, impacts to local services and utilities are expected to be insignificant. However, emergency preparedness planning will be implemented to reduce potential impacts in the event of an emergency. No additional mitigation will be required.

**Taxes** - Potential impacts to public services and utilities will be mitigated by the tax revenues generated by the Project.

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CULTURAL RESOURCES	
<b>Studies to Avoid Impacts</b> - A cultural resources evaluation was implemented to identify and assess any potential impact on cultural resources located within the Project area.	
<b>Project Design</b> - The recommended 100 foot setback around all documented culturally sensitive areas will be implemented for all design scenarios. It is anticipated that by following this guideline, no impacts to culturally sensitive areas will occur under any of the proposed scenarios.	
TRAFFIC AND TRANSPORTATION	
<b>Construction</b> - During construction, roadways and intersections in the vicinity of the Project site will provide an acceptable level of passage for traffic, even during the evening peak periods. However, the following mitigation measures are proposed to further reduce the impact of Project construction on roadway traffic in the region: <ul style="list-style-type: none"><li>• The Applicant will prepare a Traffic Management Plan with the construction contractor outlining steps for minimizing construction traffic impacts;</li><li>• The Applicant will provide notice to adjacent landowners when construction takes place to help minimize access disruptions;</li><li>• The Applicant will provide proper road signage and warnings of “Equipment on Road,” “Truck Access,” or “Road Crossings;”</li><li>• When slow or oversized wide loads are being hauled, advance signage and traffic diversion equipment will be used to improve traffic safety. Pilot cars will be used as DOT codes dictate depending on load size and weight;</li><li>• The Applicant will construct necessary site access roads and entrance driveways that will be able to service truck movements of legal weight;</li><li>• The Applicant will encourage carpooling for the construction workforce to reduce traffic volume;</li><li>• In consultation with Kittitas County, the Applicant will provide detour plans and warning signs in advance of any traffic disturbances;</li><li>• The Applicant will employ flaggers as necessary to direct traffic when large equipment is exiting or entering public roads to minimize risk of accidents;</li><li>• One travel lane will be maintained at all times.</li></ul>	
<b>Operations</b> - Because Project operation and maintenance will not significantly affect traffic and transportation, no mitigation is proposed.	
HEALTH AND SAFETY	
<b>Project Design</b> - Primary among the means of preventing hazards will be adherence to appropriate design and construction protocols such as IEC 61400-1. This will assure that the load assumptions, design, construction standards and safety features are in accordance with industry norms and benefit from the experience of many manufacturers and operators. A second important form of prevention is establishing a skilled workforce and implementing effective facility-wide maintenance, surveillance, and security programs.	



***Table 1.5.2-1; Summary of Impacts and Mitigation Measures***

**Project Design** - Every hazard decreases as some function of distance. Therefore, hazards are reduced or eliminated by prohibiting or controlling presence in the area potentially affected by the hazard.

**Project Design** - Wind turbine generators are equipped with multiple safety systems as standard equipment. As examples: rotor speed is controlled by a redundant pitch control system and a backup disk brake system; critical components have multiple temperature sensors and a control system to shut the system down and take it off-line if an overheat condition is detected.

**Lightning** - The WTGs are equipped with an engineered lightning protection system that connects the blades, nacelle, and tower to the earthing system at the base of the tower. As the rotor blades are nonmetallic, they normally do not act well as a discharge path for lightning, however, as the highest point of the turbine, the blades sometimes provide the path of least resistance for a lightning strike. In order to protect the blades, they are constructed with an internal copper conductor extending from the blade tip down to the rotor hub which is connected to the main shaft and establishes a path through the gearbox, nacelle bed frame etc. to the tower base right down to the grounding system embedded underground. An additional lightning rod extends above the wind vane and anemometer at the rear of the nacelle. Both the rear lightning rod and blades have conductive paths to the nacelle bed frame that in turn connects to the tower. The tower base is connected to the earthing system at diametrically opposed points.

**Tower Collapse** - The selected wind turbine generator/ tower combination will be subjected to engineering review to assure that the design and construction standards are appropriate for the Project. This review will include consideration of code requirements under various loading conditions and give a high degree of confidence of structural adequacy of the towers. The turbines are more than 9,000 feet from the nearest residence and more than 2 miles from the nearest public road and as such, a reasonable set-back requirement of at least one tip height is far exceeded in the Project location and design.

**Blade Throw** - Certification of the wind turbine to the requirements of IEC 61400-1 will assure that the static, dynamic and defined-life fatigue stresses in the blade will not be exceeded under the combined load cases expected at the Project site. The standard includes safety factors for normal, abnormal, fatigue and construction loads. This certification, together with regular periodic inspections, will give a high level of assurance against blade failure in operation. The turbines are more than 9,000 feet from the nearest residence and more than 2 miles from the nearest public road and as such, a reasonable set-back requirement of at least one tip height is far exceeded in the Project location and design.

**Ice Throw** - Ice throw over 100 meters (328 feet) has not been documented as a hazard and no ice throw injury has ever been reported from operating wind projects. Certain manufacturers have heated rotor blades in development testing. This would not be a practical consideration for the proposed facility due to the low hazard and low frequency of icing. The turbines are more than 9,000 feet from the nearest residence and more than

***Table 1.5.2-1; Summary of Impacts and Mitigation Measures***

2 miles from the nearest public road and as such, a reasonable set-back requirement of at least one tip height or at least 100 meters is far exceeded in the Project location and design.

**Explosions** - To avoid uncontrolled explosions during blasting for excavation work, only state licensed explosive specialist contractors are allowed to perform this work – explosives require special detonation equipment with safety lockouts, vegetation will be cleared from the general footprint area surrounding the excavation zone to be blasted, and standby water spray trucks and fire suppression equipment will be present during blasting activities.

**Fire** - Location of transformers and electrical equipment below ground will harden them against tower collapse, blade throw and vandalism, thereby reducing the fire hazard.

**Fire** - In order to prevent electrical fires, all equipment used is designed to meet NEC and NFPA standards. Graveled areas with no vegetation will surround substation, fused switch risers on overhead pole line, junction boxes and pad switches. A fire suppressing, rock filled, oil containment trough will surround the substation transformer.

**Fire** - In normal operation, regular maintenance, including review of real time and stored temperature sensor readings, will highlight developing problems and facilitate prevention of equipment-caused fire. Large wind generators have such systems as standard equipment.

**Fire** - In order to avoid fires caused by dry vegetation in contact with hot exhaust catalytic converters under vehicles, no gas powered vehicles will be allowed outside of graveled areas, mainly diesel vehicles (i.e. w/o catalytic converters) will be used on site, and high clearance vehicles will be used on site if used off-road.

**Fire** - During the construction period, it will be necessary to give all workers fire safety training and to implement a work plan that minimizes the risk of fire. Appropriate fire suppression equipment will be available to designated employees trained in its use.

**Fire** - During construction, portable generators will not be allowed to operate on open grass areas, and generators will be fitted with spark arrestors on the exhaust system.

**Fire** - In areas where there are torches or field welding present, the immediate surrounding area will be wetted with a water sprayer and fire suppression equipment will be present at location of welder/torch activity.

**Fire** - Smoking will be restricted to designated areas (outdoor gravel covered areas).

**Fire** - As general fire prevention measures, all on-site service vehicles will be fitted with fire extinguishers; fire station boxes with shovels, water tank sprayers, etc. will be installed at multiple locations on-site along roadways during summer fire season.

**Security** - The Site Project Manager will work with a security contractor to develop a

***Table 1.5.2-1; Summary of Impacts and Mitigation Measures***

plan to effectively monitor the overall site during construction including drive-around security and specific check points. The security inspection and monitoring plan will be changed throughout the course of construction based on the level of construction activity and amount of sensitive or vulnerable equipment and materials in specific area. Much of the security monitoring activities will be straight forward since all site access ways will be accessible from paved and well maintained county roads.

**Security** - Site visitors including vendor equipment personnel, maintenance contractors, material suppliers and all other third parties will require permission for access from authorized Project staff prior to entrance. The Plant Operations Manager, or designee, will grant access to any critical areas of the site on an as-needed basis. Site access will be controlled and all visitors or contractors on the site will be required to carry an identification pass.

**Security** - Construction materials will be stored at the individual turbines locations, or at the lay-down area around the perimeter of the Operations and Maintenance (O&M) facility and site construction trailers. Temporary fencing with a locked gate will be installed for a roughly 1.5 acre area adjacent to the site trailers for the temporary storage of any special equipment or materials. After construction is completed, the temporary fencing will be removed and the area re-seeded with an appropriate seed mix.

**Security** - Both the O&M facility and the main substation will be equipped with outdoor lighting and motion sensor lighting. The substation will be surrounded by an 8 foot tall chain-link fence with barbed wire along the top. All wind turbines, pad transformers, pad mounted switch panels and other outdoor facilities will all have secure, lockable doors.

**Security** - The plant operations group will prepare a detailed security plan to be implemented to protect the security of the Project and Project personnel.

**Emergency Response** - On-site emergency plans will be prepared to protect the public health, safety and environment on and off the Project site in the case of a major natural disaster or industrial accident relating to or affecting the Project. The Applicant shall prepare the plans and be responsible for implementing the plans with its operations team in coordination with the local emergency response support functions. The plans will describe the emergency response procedures to be implemented during various emergency situations that may affect the Project or the surrounding community or environment.